MATHER AFB
CALIFORNIA

ADMINISTRATIVE RECORD
COVER SHEET

AR File Number 467725

Department of Toxic Substances Control

Matthew Rodriquez
Secretary for
Environmental Protection

Barbara A. Lee, Director
8800 Cal Center Drive
Sacramento, California 95826-3200

Edmund G. Brown Jr.
Governor

October 2, 2015

Mr. Douglas L. Self
Air Force Civil Engineering Center (AFCEC/CIBW)
3411 Olson Street
McClellan, California 95652-1003

FINAL FOURTH FIVE-YEAR REVIEW REPORT, FORMER MATHER AIR FORCE BASE, CALIFORNIA

Dear Mr. Self:

The Department of Toxic Substances Control (Department) staff has reviewed the Final Fourth Five-Year Review Report (FYRR) which was email to the regulatory agencies on September 1, 2015. The five-year review report evaluates the performances of the remedial actions conducted during the fourth five-year review period to determine whether the remedial actions are protective of human health and the environment. The Final FYRR was prepared by URS Group, Inc. for the Air Force Civil Engineer Center (AFCEC/CIBW).

The Department's staff comment on the draft final document requested the FYRR be revised to make the topic of vapor intrusion risk evaluations for current and future workers in existing buildings a formal issue in the document. The Air Force did not concur with the request to revise the FYRR on this topic; on the basis they remain committed to evaluate vapor intrusion risk to current workers. Recent shallow soil gas sampling results near Building 4260 (Site 59) presented during the Mather BRAC Cleanup Team meeting on June 10, 2015 indicated that trichloroethene (TCE) soil gas concentrations were substantially higher than previous results. Furthermore, the maximum TCE concentration was measured approximately 25 feet south of Building 4260 and adjacent to an occupied office area.

The attached comment from Ms. Kimberly C. Gettmann, Ph.D. and Mr. Jeff Brown, P.G., should be responded to or resolved. Subsequent changes to the Final Mather Fourth Five- Year Review Report may be warranted.

If you have any questions, please contact me by email at franklin.mark@dtsc.ca.gov, or at (916) 255-3584.

Sincerely,

Franklin Mark

Franklin Mark, P.E.
Hazardous Substance Engineer
Cleanup Program – Sacramento Office

Attachments

RECEIVED
OCT 08 2015

cc: (By email)

Mr. John Lucey
U.S. Environmental Protection Agency, Region 9
lucey.john@epa.gov

Mr. William T. Hughes
Cherokee Nation Government Services (CNGS)
c/o AFCEC/CIBW
william.hughes@cn-bus.com

Mr. Paul Graff, P.G., C.H.G.
AECOM
paul.graff@aecom.com

Mr. Marcus Pierce
Regional Water Quality Control Board
Central Valley Region
marcus.pierce@waterboards.ca.gov

Department of Toxic Substances Control

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Secretary for
Environmental Protection

Barbara Lee
Director
8800 Cal Center Drive
Sacramento, California 95826-3200

Edmund G. Brown Jr.
Governor

TO: Franklin Mark, Project Manager
Brownfields and Environmental Restoration Program
8800 Cal Center Drive
Sacramento, CA 95826

FROM: Kimberly C. Gettmann, Ph.D.
Staff Toxicologist, Human and Ecological Risk Office (HERO)

DATE: September 16, 2015

SUBJECT: FINAL FOURTH FIVE-YEAR REPORT, FORMER MATHER AIR FORCE BASE, SACRAMENTO COUNTY, CALIFORNIA. AUGUST 2015

PCA: 14718 Site: 100104-47 EnviroStor #WR20032553

DOCUMENT REVIEWED: Final Fourth Five-Year Report, Former Mather Air Force Base, Sacramento County, California (Report). Document dated August 2015. Prepared for AFCEC/CIBW, Joint Base San Antonio, Texas. Prepared by URS Group, Inc., Sacramento, California. HERO received a copy of the Final Report on September 2, 2015.

BACKGROUND BASED ON INFORMATION PROVIDED IN THE SUBMISSION:
Mather is located approximately 10 miles east of downtown Sacramento. Mather Air Force Base (AFB) was officially closed on 30 September 1993. The Report is the fourth Five-Year Review that addresses contamination at Operable Units (OUs) 1 through 6 at Former Mather AFB. The Installation Restoration Program (IRP) Sites located in OUs 1 through 6 and part of the Five-Year Review include: IRP Sites Landfill (LF)-03, LF-04, Waste Pit (WP)-07, Fire Training (FT)-10C, FT-11. WP-12, LF-18, Other (OT)-23, Storage Tank (ST)-37, ST-39, SS-54, Storm Drain (SD)-57, SD-59, ST-68, OT-69, OT-87, and OT-89. OU 1 (also referred to as the AC&W OU) consists of a contaminated groundwater plume, as well as three sites where underground storage tanks (USTs) were removed. OU 2 (referred to as the Groundwater OU) consists of three contaminated groundwater plumes, mainly contaminated with volatile organic compounds (VOCs). OU 3 (referred to as the Soil OU) comprises contaminated soil associated with waste disposal pits, oil-water separators (OWS), gas stations, USTs, fire training areas, and other contaminated soil sites. OU 4 (referred to as the Landfill OU) consists of six sites where municipal waste was buried. OUs 5 and 6 (referred to as the Basewide OU and Supplemental Basewide OU, respectively) consist of the contaminated soil sites not included in the other OUs.

The primary groundwater contaminants of concern (COCs) include: trichloroethene (TCE), total petroleum hydrocarbons (TPH) as diesel (TPH-d), as gasoline (TPH-g), lead, tetrachloroethene (PCE), 1,1-dichloroethene, cis-1,2-dichloroethene, 1,2-dichloroethane, carbon tetrachloride, benzene, xylenes, chloromethane, vinyl chloride, and 1,4-dichlorobenzene.

The primary soil COCs include: TPH-d, TPH-g, carbon tetrachloride, benzene, toluene, ethylbenzene, xylenes, lead, PCE, TCE, 1,2-dichloroethene, benzo(a)pyrene, benzo(g,h,i)perylene, dibenzo(a,h)anthracene, flouranthene, and phenanthrene.

HERO previously reviewed the Draft Fourth Five-Year Report in a memorandum dated October 22, 2014 (K. Gettmann to F. Mark) and the Air Force Response to Comments in a memorandum dated February 11, 2015 (K. Gettmann to F. Mark).

SCOPE OF REVIEW: HERO's review focused on the responses to our October 22, 2014 and February 11, 2015 memoranda and the revisions to the Report concerning human health risk assessment. We assume that regional DTSC staff has evaluated the adequacy of the reported for site status and whether or not institutional controls are in place and properly implemented.

GENERAL COMMENTS - HUMAN HEALTH RISK ASSESSMENT

1. In general, HERO concurs with and appreciates the Air Force's responses to our General Comments. HERO reviewed the Final Report and the text was revised as recommended in the responses. HERO's outstanding concerns with the Report are discussed below.

2. Response to October 22, 2014 General Comment 4 and February 11, 2015 General Comments 3.b.iii and iv - Vapor Intrusion to Indoor Air for Existing Buildings – Site SD-59. HERO has the following concerns regarding the potential vapor intrusion to indoor air risk due to subsurface TCE at Building 4260, Site SD-59, and the protectiveness of the current remedy.

a. *Site SD*-59.

i. May 2015 Soil Vapor Sampling Results from Building 4260 Site SD-59 (Executive Summary page ES-13 and Section 7.4.4.1 page 7-32). Additional soil vapor wells were installed at the southern end of Building 4260 and sampled in May 2015. The results from this sampling event show high concentrations of TCE in the subsurface at shallow depths of 8-10 feet below ground surface (bgs). TCE was detected at a concentration of 160 ppmv in soil vapor well 59-PW-12A (8-10 feet bgs), at a concentration of 59 ppmv at well 59-PW-12B (20-22 feet bgs), at a concentration of 14 ppmv in well 59-PW-09A (10-11 feet bgs), and at a concentration of 19 ppmv in well 59-PW-09B. The TCE concentrations detected in wells 59-PW-09A and 59-PW-09B are 2-3-times greater than the November 2014 sampling results. The text on pages ES-13 and 7-32 state that the cancer risks associated with the soil vapor TCE concentrations (7 ppmv) from the November 2014 sampling event are within the risk management range, 1.25E-05, and noncancer hazard of 4.7. The cancer risks and noncancer hazard from the most recent, May 2015, sampling event are considerably greater. Please see the table below. The cancer risk associated with soil vapor well 59-PW-12A, located next to Building 4260 at the southern end, is 2.9E-04, which is greater than the risk management range of 1E-06 to 1E-04. The noncancer hazard is 107, substantially greater than 1.

	November 2014			May 2015		
Soil Vapor Well	[TCE] (ppmv)	Cancer Risk	Noncancer Hazard	[TCE] (ppmv)	Cancer Risk	Noncancer Hazard
59-PW-9A (10-11 ft bgs)	5.7	1.0E-05	3.8	14	2.5E-05	9.3
59-PW-9B (20-21 ft bgs)	7	1.25E-05	4.7	19	3.4E-05	12.7
59-PW-12A* (8-10 ft bgs)				160	2.9E-04	107
59-PW-12B* (20-22 ft bgs)				59	1.1E-04	39.3

*Soil vapor wells were installed in May 2015.

The May 2015 sampling data needs to be discussed in the Five Year Review as it indicates that the vapor intrusion to indoor air cancer risk and noncancer hazard are substantially greater than previously reported. Additionally, the short-term protectiveness of workers in the offices located at the southern end of Building 4260 cannot be determined at this time until further investigation.

ii. HERO reiterates our recommendation to collect indoor air samples in the offices sooner rather than later to ensure there is no current risk to occupants especially given the May 2015 soil vapor sampling results.

iii. Section 7.4.4.3 – Protectiveness of the remedy. HERO does not concur with the Air Force response to HERO's February 11, 2015 General Comment 3.b.iv. The November 2014 and May 2015 soil vapor data from the southern wall of the Building 4260 calls into question whether the current remedy is protective in the short-term. Due to the most recent soil vapor data, the protectiveness for the short term at SD-59 should be "protectiveness deferred" for Building 4260.

3. Short-Term Protectiveness Statements for Building 4260 Site SD-59 (Summary Form page SF-5, Executive Summary page ES-13) and Response to February 11, 2015 General Comment 4 - Section 9.7 – Comprehensive Protectiveness Statement for Mather. Please see HERO's General Comment 2.a.iii regarding the protectiveness for Building 4260.

CONCLUSIONS

HERO reviewed the Final Fourth Five-Year Report, Former Mather Air Force Base, Former Mather Air Force Base, Sacramento, as it relates to human health risk assessment. HERO's concerns regarding the potential vapor intrusion to indoor air risk due to subsurface TCE at Building 4260, Site SD-59, and the protectiveness of the current remedy are discussed above in our comments. HERO recommends that all of the issues discussed be addressed prior to acceptance and finalization of this Report.

Reviewed by: Michael J. Wade, Ph.D., D.A.B.T.
Senior Toxicologist, HERO

CC: Jeff Brown, P.G.
Engineering Geologist
Sacramento Geological Services Unit

Department of Toxic Substances Control

Matthew Rodriquez
Secretary for
Environmental Protection

Barbara A. Lee, Director
8800 Cal Center Drive
Sacramento, California 95826-3200

Edmund G. Brown Jr.
Governor

MEMORANDUM

TO: Franklin Mark, PE #37040
Hazardous Substances Engineer
Brownfields and Environmental Restoration Program

FROM: Jeff Brown, PG #7757
Engineering Geologist
Sacramento Geological Services Unit
Geological Services Branch
Brownfields and Environmental Restoration Program

REVIEWER: Stephen C. Sterling, CHG #651
Senior Engineering Geologist
Sacramento Geological Services Unit
Geological Services Branch
Brownfields and Environmental Restoration Program

DATE: September 30, 2015

SUBJECT: Five Year Review Report
Former Mather Air Force Base
Sacramento, California 95655
Project No. 14718/100104-47/20032552

DOCUMENT REVIEWED

Final Mather Fourth Five-Year Review Report [Report], Former Mather Air Force Base, California (Redline/Strike-Out Proposed Changes), prepared by the URS Group Inc., submitted via email on September 1, 2015.

The Sacramento Geological Services Unit (GSU) of the Department of Toxic Substances Control (DTSC) reviewed the above-referenced document and prepared the following comments and recommendations. If you have any questions regarding this memorandum, please contact me at (916) 255-3704 or jeff.brown@dtsc.ca.gov.

COMMENTS

1. **Protectiveness Statements Specific to Workers in Building 4260.** GSU disagrees with the conclusion that workers in Building 4260 are protected in the short term as suggested in Section 9.3 and Section 9.7 of the Report.

   In addition, text in both of these sections as well as Section 7.0 appears to extend claims of protectiveness associated with Site 59, to workers in Building 4260. This approach is inappropriate and not supportable for reasons addressed in the text below.

   Pursuant to the *Comprehensive Five-Year Review Guidance* (USEPA, 2001) and the memoranda titled *Assessing Protectiveness at Sites for Vapor Intrusion* (USEPA, 2012a) and *Clarifying the Use of Protectiveness Determinations for Comprehensive Environmental Response, Compensation, and Liability Act Five-Year Reviews* (USEPA, 2012b), insufficient information exists to demonstrate workers in Building 4260 are currently protected.

   Support for this conclusion is provided below (under items a through f) and in Attachment A of this memorandum:

   a) Risk evaluations were recently completed by DTSCs Human Health and Ecological Risk Office (HERO) (in a memorandum dated September 16, 2015) using May 2015 soil vapor data. This evaluation demonstrates the soil vapor inhalation risk to workers at Building 4260 is unacceptable because it is outside of the risk management range of 10^{-4}.

   b) The Building 4260 scenario fails all three of the USEPA technical assessment questions (A, B, C) which govern how protectiveness statements are selected in Five Year Reviews (see Attachment A).

   c) Trichloroethene (TCE) and other contamination near and/or beneath Building 4260 is undelineated.

   d) Remedies have neither been evaluated nor selected to address the contamination present near Building 4260. Contamination near this Building is not yet recognized in either the ROD (AFBCA, 1996) or the Explanation of Significant Differences (ESD) (AFRPA, 2010). Therefore, the contamination at Building 4260 is uncontrolled.

   e) The SVE system for Site 59 cannot be used (in its current configuration) to control contamination or claim workers in Building 4260 are protected from potential indoor air inhalation risks. This is because the SVE system failed to remove high levels of TCE at shallow depths on the south side of the building, less than 100 feet away from its nearest extraction well.

f) Building 4260 is currently not within an institutional control (IC) boundary:

- The AF proposal to expand IC boundaries of Site 59 to include Building 4260 does not contribute to the current protectiveness conclusions for Building 4260 because this action has not yet occurred. A revision to the ESD is needed to implement this change (see comment #2 for related concerns);

- Moreover, the act of changing IC boundaries does not provide protection to workers unless 1) revisions to the ESD include specific actions capable of establishing protectiveness to workers, and 2) those specific actions are completed by the AF. These actions may include periodic indoor air sampling (to verify incomplete pathways) or the installation of engineering controls and/or mitigation measures within the building.

Revisions Needed to the Report

The Report should not be approved by DTSC until the following revisions are made:

- Protectiveness statements in Sections 9.3 and 9.7 should be made specific to workers in Building 4260 using USEPA criteria and the current facts and data. Protectiveness statements specific to OU 3 (Soil OU) sites should be segregated from protectiveness statements specific to workers in Building 4260.

  - In accordance with USEPA guidance and protocols, protectiveness of workers in Building 4260 at this time is best categorized as "not protective" because, 1) no remedy has been assigned to the contamination present, 2) the contamination remains uncontrolled, and 3) risk exceeds the risk management range of 10^{-4} and the hazard index of 1. See Attachment A for additional discussion.

    However, the AF or the USEPA may have additional information or insights in accordance with USEPA guidance and protocols which may allow Building 4260 to meet the standards of "protectiveness deferred."

- If the AF and/or USEPA elect to make a "protectiveness deferred" determination for Building 4260 workers, then pursuant to USEPA guidance (2001, 2012a, 2012b), Section 8.0 should be revised to provide a timeframe for when a protectiveness determination can be made and identify the specific activities that will be conducted to achieve this timeframe.

These activities should, at a minimum, include a commitment by the AF to conduct indoor air sampling that provides decision quality data, as opposed to relying on screening level photo-ionization detector (PID) readings.

2. **GSU Comment #5d: Vapor Intrusion Risk to Workers and Need to Revise the ESD.** The AF response to this comment is inadequate. The AF continues to believe their response to soil vapor intrusion risk evaluations is appropriate and disagrees with DTSCs recommendation to close the loophole in the ESD (AFRPA, 2010), related to protection of the worker in existing buildings.

   However, review of the draft Site 57 report, Site 59/Building 4260 investigation work (over the past three years), and most recently the Five Year report, demonstrates the AF approach to addressing vapor intrusion risk continues to be unacceptable.

   The following two examples are provided to illustrate why the AF response to this issue is unacceptable and why a formal closure evaluation process in the ESD (or memorandum to file) is needed to properly address soil vapor intrusion risk at existing buildings:

   Example #1:

   In the draft closure report for Site 57, the AF did not evaluate vapor intrusion inhalation risk nor mention the current status of building occupancy at the site.

   - Instead, the closure report focused almost entirely on threats to groundwater. DTSC had to request building occupancy information from the AF during our review period, and then request new soil vapor samples be collected (in lieu of using five year old data) to support closure evaluations.
   - Only after these requests were made and the data collected, did the AF agree to conduct an indoor air inhalation risk assessment (RA).
   - Results of the RA led the AF to rescind the draft closure report and restart the SVE system to protect groundwater and address the potential threat to the workers who were recently confirmed to be occupying Building 7022.

   Example #2:

   The AF did not include the May 2015 soil vapor data collected near Building 4260 in this most recent version of the Five Year Report, even though this information was available.

   - This omission is significant because, if the data were included, protectiveness statements for workers in Building 4260 would need to be

downgraded (as noted in comment #1 above) and the AF would be compelled to take appropriate action to demonstrate protectiveness of the workers. This is because TCE concentrations detected in May 2015 were at least one order magnitude higher (than data available during the draft report preparation) and would have driven the risk outside of the risk management range of 10^{-4}.

- Instead, the report makes claims of protectiveness based on the results of a single screening-level PID reading taken somewhere in Building 4260.

- To date, the AF has yet to make any commitment to collect indoor air samples. In response, the Regional Water Quality Control Board (RWQCB) has recently informed the AF by letter that soil vapor samples will be collected and analyzed by the RWQCB due to the unresponsiveness of the AF on this matter.

ATTACHMENT A:
Evaluation of Protectiveness

Attachment A:
Evaluation of Protectiveness:

The following text is provided to help illustrate reasons the AF, at this time, does not have sufficient support to claim workers in Building 4260 are protected currently (e.g. short term protective). The analysis below uses USEPA guidance and protocols for making protectiveness determinations:

- Claims of Short-Term, Long-Term, and Deferred Protectiveness are Typically Reserved for Sites with Selected Remedies in Place or under Construction.
  No remedy has been selected or designed for the soil vapor contamination which currently poses a potential threat to workers in Building 4260. The source of this contamination is confirmed to be unrelated to Site 59 or any other soil site identified in the ROD or ESD.

- Technical Assessment: Questions A, B, and C.
  In accordance with the USEPA (2012a and 2012b) and the answers resulting from technical assessment questions A, B, and C, the conditions at Building 4260 qualify best for a "not protective" determination and fail to qualify for a short- or long-term protective determination:

  - Protectiveness 'Question A' is Failed. The soil remedies selected for Mather AFB are not functioning as intended by the decision document in this area of the former Mather AFB. The ROD intended to address all soil sites and remedies. However, contamination near Building 4260 is outside of known all soil site boundaries identified in the ROD and ESD and is present at concentrations which threaten human health and the environment. In addition, no remedy has been selected for this contamination; therefore the contamination is uncontrolled. Both of these criteria are linked to sites classified as "not protective" pursuant to USEPA guidance (USEPA, 2012b).

  - Protectiveness 'Question B' is Failed. Exposure assumptions used at the time of the remedy selection are no longer valid. Soil vapor contamination was not known to be present beneath or near Building 4260 or to be present at concentrations (e.g. TCE 160,000 ppbv) which threaten workers above the risk management range of $1x10^{-4}$ (see HERO memorandum dated September 16, 2015).

  - Protectiveness 'Question C' is Failed. Significant new information has been obtained since the last Five Year review report for the Building 4260/Site 59 area. This information, as outlined above and by HERO risk evaluations, shows evidence of a new site and source that was not identified in the ROD or ESD, calling into question the protectiveness of the remedies selected, and warranting a revision to the ESD.

REFERENCES

AFBCA, 1996. *Soil and Groundwater Operable Unit Record of Decision (ROD)*, April.

AFRPA, 2010. *Revised Final Explanation of Significant Differences (ESD) from the Record of Decision for Soil Operable Unit Sites and Groundwater Operable Plumes*, February.

DTSC, 2011. *Guidance for the Evaluation and Mitigation of Subsurface Vapor Intrusion to Indoor Air.* October

USEPA, 2001. *Comprehensive Five Year Review Guidance.* OSWER 9355.7-03B-P, June.

USEPA, 2012a. *Assessing Protectiveness at Sites for Vapor Intrusion, Supplement to the "Comprehensive Five-Year Review Guidance",* OSWER Directive 9200.2-84. November.

USEPA, 2012b. *Clarifying the Use of Protectiveness Determinations for Comprehensive Environmental Response, Compensation, and Liability Act Five-Year Review*

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ADMINISTRATIVE RECORD

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