



U.S. DEPARTMENT OF
ENERGY

OFFICE OF
**ENVIRONMENTAL
MANAGEMENT**

West Valley Demonstration Project Disposition of Tank 8D-4 Contents

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DOE WVDP Director

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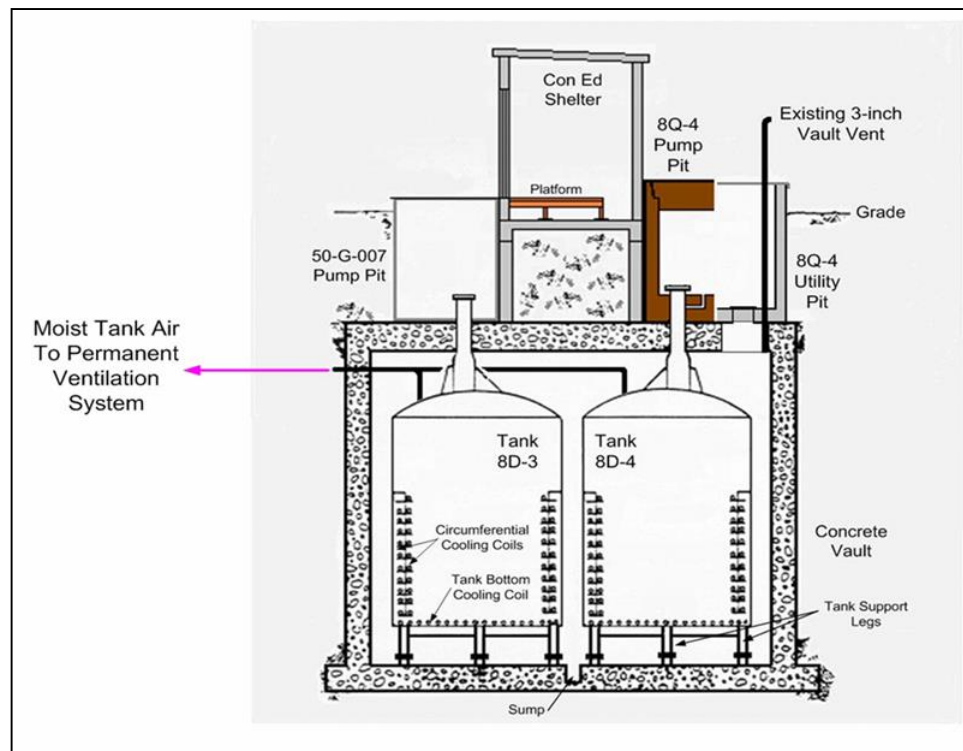
EM ***Environmental Management***

safety ❖ performance ❖ cleanup ❖ closure

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WVDP Underground Tank 8D-4

- Stainless steel tank
- 14,300 gallon capacity
- Enclosed within an underground concrete vault with identical Tank 8D-3
- Active HEPA-filtered tank ventilation provided by the Permanent Ventilation System (PVS)
- Contains ~4600 gallons of contaminated liquid and sludge



Characterization of Tank 8D-4 Liquid

Results of sampling in 2012 determined that the liquid is:

- Generally clear liquid
- Consistent dose rate throughout entire liquid region in tank (~ 170 to 200 mR/hr as measured at the recirculation line of the sampler)
- RCRA metals chromium, mercury, and selenium exist above 6 NYCRR 371 characteristic levels
- Contains $\sim 5\%$ dissolved solids, minimal suspended solids, and pH of ~ 9.5
- Gross alpha radioactivity of $\sim 2\text{E-}02$ $\mu\text{Ci/ml}$
- Gross beta activity of $3\text{E}+01$ $\mu\text{Ci/ml}$
- No oil sheen noted on top of liquid layer



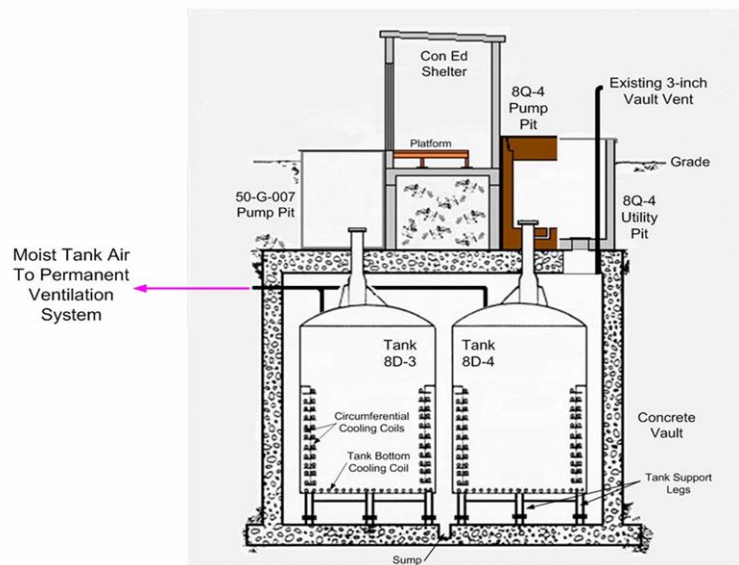
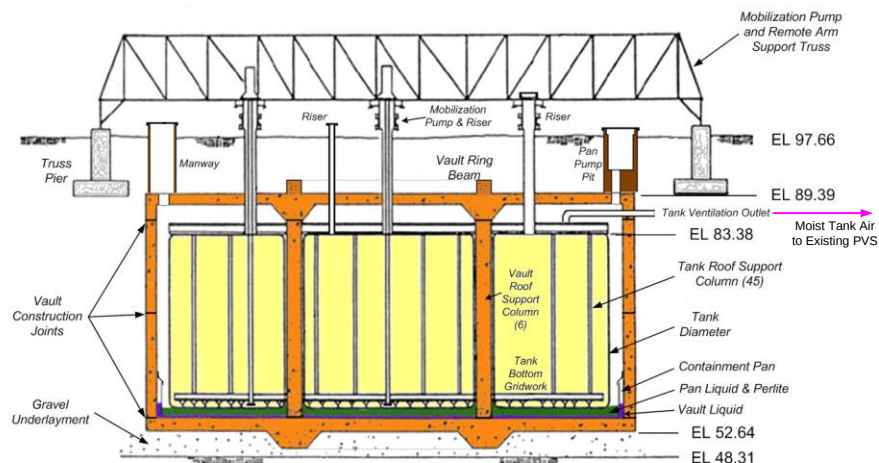
Characterization of Tank 8D-4 Sludge

Results of sampling in 2012 determined that the sludge is:

- Generally brown fine, easily suspendable “ash-like” particles with a high water content (~20% of total volume)
- Dose rates ranged from approximately 500 to 5,000 mR/hr for the 50-ml nominal sludge/liquid samples
- RCRA metal mercury exists above 6 NYCRR 371 characteristic levels
- After centrifuging, exhibits 50 to 60% moisture and pH of ~9.3
- Gross alpha radioactivity of $\sim 3\text{E}+01$ $\mu\text{Ci/g}$
- Gross beta activity of $3\text{E}+03$ $\mu\text{Ci/g}$
- No visible elemental mercury seen during sampling of sludge or other matrices

WVDP Waste Tank Farm

- Two large carbon steel tanks: 8D-1 and 8D-2, 760,000 gallons each
- Two small stainless steel tanks: 8D-3 and 8D-4, 14,300 gallons each
- Tanks enclosed within underground concrete vaults
- Active HEPA-filtered tank ventilation provided by the Permanent Ventilation System (PVS)



WVDP Waste Tank Farm History

- Tanks 8D-2 and 8D-4 previously contained HLW from spent fuel reprocessing: 1966-72
- HLW retrieved and vitrified into 275 canisters between 1996 and 2002
- Over 90% of remaining residual liquid removed and processed in 2003
- 26,000 gallons remained in four underground tanks
- Decisions on Tank Farm closure will not be made until 2020

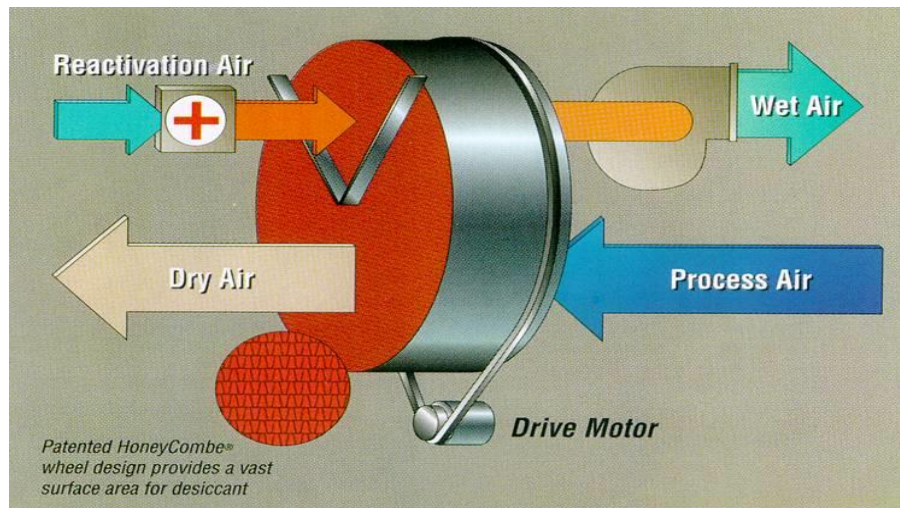
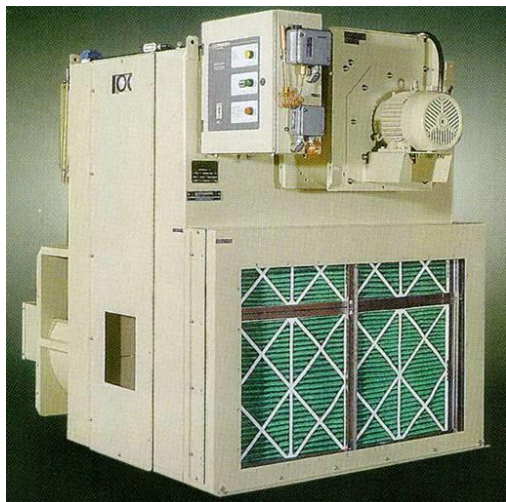


WVDP Waste Tank Farm

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- The screenshot displays the 'West Valley SMS Control System' interface. The main window shows a complex process flow diagram for 'WTE Tank & Vault Drying'. The diagram includes several tanks (WTE TANK, VAULT, WTE TANK) and associated piping, valves, and pumps. Key components and labels include:
- Process Supply:** Located on the left, it shows a flow rate of 22.2 g and a pressure of 0-2-127.
 - WTE Tank & Vault Drying:** The central process area, featuring a large circular tank labeled 'WTE TANK' and a rectangular tank labeled 'VAULT'.
 - 7eV Dryer:** Located on the right, it includes a '7eV Dryer' label and a '7eV Dryer' label.
 - Flow Meters and Valves:** Various flow meters (e.g., 0-2-120, 0-2-122, 0-2-123, 0-2-124, 0-2-125, 0-2-126, 0-2-127, 0-2-128, 0-2-129, 0-2-130, 0-2-131, 0-2-132, 0-2-133, 0-2-134, 0-2-135, 0-2-136, 0-2-137, 0-2-138, 0-2-139, 0-2-140, 0-2-141, 0-2-142, 0-2-143, 0-2-144, 0-2-145, 0-2-146, 0-2-147, 0-2-148, 0-2-149, 0-2-150, 0-2-151, 0-2-152, 0-2-153, 0-2-154, 0-2-155, 0-2-156, 0-2-157, 0-2-158, 0-2-159, 0-2-160, 0-2-161, 0-2-162, 0-2-163, 0-2-164, 0-2-165, 0-2-166, 0-2-167, 0-2-168, 0-2-169, 0-2-170, 0-2-171, 0-2-172, 0-2-173, 0-2-174, 0-2-175, 0-2-176, 0-2-177, 0-2-178, 0-2-179, 0-2-180, 0-2-181, 0-2-182, 0-2-183, 0-2-184, 0-2-185, 0-2-186, 0-2-187, 0-2-188, 0-2-189, 0-2-190, 0-2-191, 0-2-192, 0-2-193, 0-2-194, 0-2-195, 0-2-196, 0-2-197, 0-2-198, 0-2-199, 0-2-200, 0-2-201, 0-2-202, 0-2-203, 0-2-204, 0-2-205, 0-2-206, 0-2-207, 0-2-208, 0-2-209, 0-2-210, 0-2-211, 0-2-212, 0-2-213, 0-2-214, 0-2-215, 0-2-216, 0-2-217, 0-2-218, 0-2-219, 0-2-220, 0-2-221, 0-2-222, 0-2-223, 0-2-224, 0-2-225, 0-2-226, 0-2-227, 0-2-228, 0-2-229, 0-2-230, 0-2-231, 0-2-232, 0-2-233, 0-2-234, 0-2-235, 0-2-236, 0-2-237, 0-2-238, 0-2-239, 0-2-240, 0-2-241, 0-2-242, 0-2-243, 0-2-244, 0-2-245, 0-2-246, 0-2-247, 0-2-248, 0-2-249, 0-2-250, 0-2-251, 0-2-252, 0-2-253, 0-2-254, 0-2-255, 0-2-256, 0-2-257, 0-2-258, 0-2-259, 0-2-260, 0-2-261, 0-2-262, 0-2-263, 0-2-264, 0-2-265, 0-2-266, 0-2-267, 0-2-268, 0-2-269, 0-2-270, 0-2-271, 0-2-272, 0-2-273, 0-2-274, 0-2-275, 0-2-276, 0-2-277, 0-2-278, 0-2-279, 0-2-280, 0-2-281, 0-2-282, 0-2-283, 0-2-284, 0-2-285, 0-2-286, 0-2-287, 0-2-288, 0-2-289, 0-2-290, 0-2-291, 0-2-292, 0-2-293, 0-2-294, 0-2-295, 0-2-296, 0-2-297, 0-2-298, 0-2-299, 0-2-300, 0-2-301, 0-2-302, 0-2-303, 0-2-304, 0-2-305, 0-2-306, 0-2-307, 0-2-308, 0-2-309, 0-2-310, 0-2-311, 0-2-312, 0-2-313, 0-2-314, 0-2-315, 0-2-316, 0-2-317, 0-2-318, 0-2-319, 0-2-320, 0-2-321, 0-2-322, 0-2-323, 0-2-324, 0-2-325, 0-2-326, 0-2-327, 0-2-328, 0-2-329, 0-2-330, 0-2-331, 0-2-332, 0-2-333, 0-2-334, 0-2-335, 0-2-336, 0-2-337, 0-2-338, 0-2-339, 0-2-340, 0-2-341, 0-2-342, 0-2-343, 0-2-344, 0-2-345, 0-2-346, 0-2-347, 0-2-348, 0-2-349, 0-2-350, 0-2-351, 0-2-352, 0-2-353, 0-2-354, 0-2-355, 0-2-356, 0-2-357, 0-2-358, 0-2-359, 0-2-360, 0-2-361, 0-2-362, 0-2-363, 0-2-364, 0-2-365, 0-2-366, 0-2-367, 0-2-368, 0-2-369, 0-2-370, 0-2-371, 0-2-372, 0-2-373, 0-2-374, 0-2-375, 0-2-376, 0-2-377, 0-2-378, 0-2-379, 0-2-380, 0-2-381, 0-2-382, 0-2-383, 0-2-384, 0-2-385, 0-2-386, 0-2-387, 0-2-388, 0-2-389, 0-2-390, 0-2-391, 0-2-392, 0-2-393, 0-2-394, 0-2-395, 0-2-396, 0-2-397, 0-2-398, 0-2-399, 0-2-400, 0-2-401, 0-2-402, 0-2-403, 0-2-404, 0-2-405, 0-2-406, 0-2-407, 0-2-408, 0-2-409, 0-2-410, 0-2-411, 0-2-412, 0-2-413, 0-2-414, 0-2-415, 0-2-416, 0-2-417, 0-2-418, 0-2-419, 0-2-420, 0-2-421, 0-2-422, 0-2-423, 0-2-424, 0-2-425, 0-2-426, 0-2-427, 0-2-428, 0-2-429, 0-2-430, 0-2-431, 0-2-432, 0-2-433, 0-2-434, 0-2-435, 0-2-436, 0-2-437, 0-2-438, 0-2-439, 0-2-440, 0-2-441, 0-2-442, 0-2-443, 0-2-444, 0-2-445, 0-2-446, 0-2-447, 0-2-448, 0-2-449, 0-2-450, 0-2-451, 0-2-452, 0-2-453, 0-2-454, 0-2-455, 0-2-456, 0-2-457, 0-2-458, 0-2-459, 0-2-460, 0-2-461, 0-2-462, 0-2-463, 0-2-464, 0-2-465, 0-2-466, 0-2-467, 0-2-468, 0-2-469, 0-2-470, 0-2-471, 0-2-472, 0-2-473, 0-2-474, 0-2-475, 0-2-476, 0-2-477, 0-2-478, 0-2-479, 0-2-480, 0-2-481, 0-2-482, 0-2-483, 0-2-484, 0-2-485, 0-2-486, 0-2-487, 0-2-488, 0-2-489, 0-2-490, 0-2-491, 0-2-492, 0-2-493, 0-2-494, 0-2-495, 0-2-496, 0-2-497, 0-2-498, 0-2-499, 0-2-500, 0-2-501, 0-2-502, 0-2-503, 0-2-504, 0-2-505, 0-2-506, 0-2-507, 0-2-508, 0-2-509, 0-2-510, 0-2-511, 0-2-512, 0-2-513, 0-2-514, 0-2-515, 0-2-516, 0-2-517, 0-2-518, 0-2-519, 0-2-520, 0-2-521, 0-2-522, 0-2-523, 0-2-524, 0-2-525, 0-2-526, 0-2-527, 0-2-528, 0-2-529, 0-2-530, 0-2-531, 0-2-532, 0-2-533, 0-2-534, 0-2-5

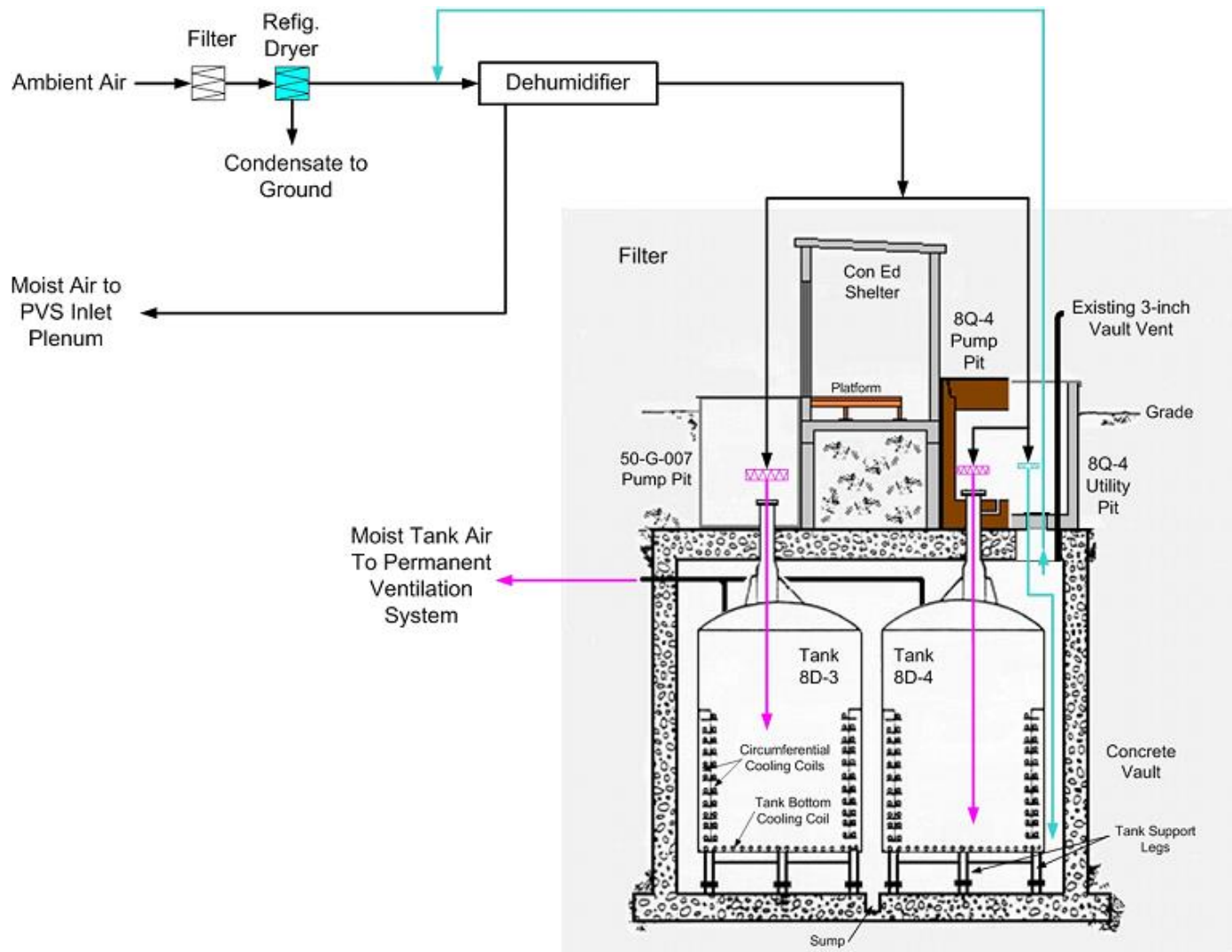
Tank & Vault Drying System Basics

- Inject very dry air into the tanks and vaults
- The dry air forces out the moist/saturated air that existed before system operation
- The dry air picks up moisture from
 - Wetted surfaces
 - Standing liquids
- The dry air with moisture picked up is exhausted from the tanks and vaults
 - Vault exhaust air is recirculated through the air dryer to remove moisture
 - Tank exhaust air is routed to the existing HEPA-filtered ventilation system and up the stack
- Desiccant dryer reactivation air is directed to the same ventilation system



Tank & Vault Drying System Schematic

Tank 8D-3 and 8D-4



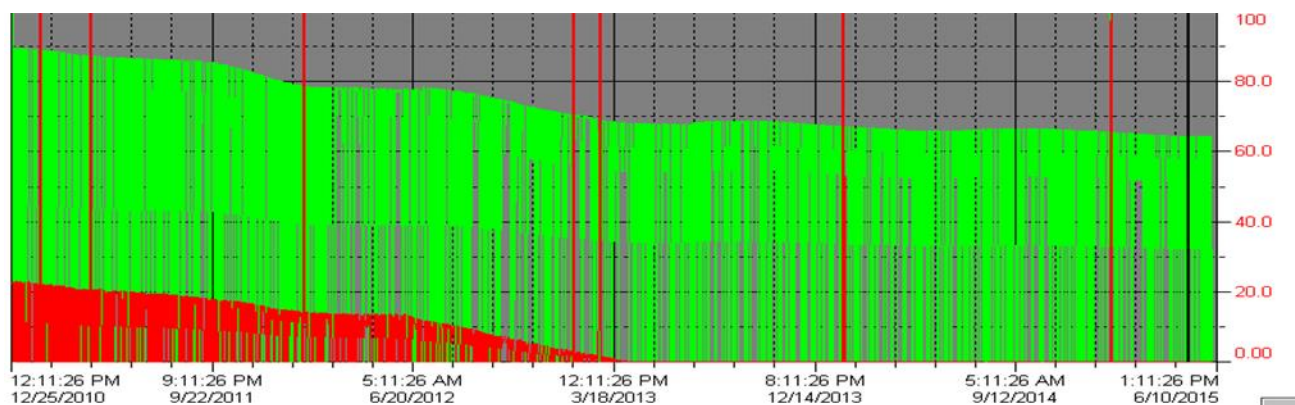
Benefits of the Drying System

- The drying system has proven its effectiveness in evaporating liquids from the underground tanks and vaults and reducing internal humidities; tanks 8D-1, 8D-2, and 8D-3 are dry
- Pan and vault liquid pumping has been eliminated – none over the past 5 years
- No measurable increase in HEPA filter differential pressure has been observed
- If additional waste is to be removed from Tanks 8D-1, 8D-2 and 8D-3, this can be accomplished using solid retrieval techniques
- Additional waste can be removed from Tank 8D-4 using conventional liquid and solid retrieval techniques

Tank or Vault	Air Flow
Tank 8D-1 & 8D-2	510 cfm each
Tank 8D-3 & 8D-4	85 cfm each
8D-1 Pan/Vault	510 cfm
8D-2 Pan/Vault	910 cfm
8D-3/4 Vault	85 cfm
Full air flows of the T&VDS	

Management of Tank 8D-4

- Evaporation was reduced in April 2013 to allow more time to resolve the disposition of the tank and its contents before the bottom sludge is uncovered
- Added 30 gallons of 50 wt% NaOH in July 2015 to increase the liquid alkalinity and reduce the potential for chloride pitting of the stainless steel tank
- Planning to sample the tank contents in December 2016 to determine whether additional pH adjustment is needed



Red 8D-3 Tank
Green 8D-4 Tank

53-Month Trend: Tank 8D-3 and 8D-4 Liquid Heel Levels (inches)

Next Steps for Tank 8D-4

- Planning to issue Sources Sought/Request for Information in early 2017 for capabilities statements from parties interested in disposition of the Tank 8D-4 heel
 - Waste Tank Farm documentation, drawings, and photographs will be provided
- Looking for innovative approaches from capable sources that
 - Minimize the radionuclide inventory
 - Minimize the potential for orphan waste (the WVDP has no access to a disposal facility transuranic waste)