POLLUTION CONTROL HEARINGS BOARD
STATE OF WASHINGTON

UNITED STATES DEPARTMENT OF ENERGY, Appellant, v. STATE OF WASHINGTON, DEPARTMENT OF ECOLOGY, Respondent.	NO. 97-157 FINDINGS OF FACT AND CONCLUSIONS OF LAW

FINDINGS OF FACT

I

In 1989, appellant United States Department of Energy (Energy), respondent State of Washington, Department of Ecology (Ecology), and the U.S. Environmental Protection Agency (EPA) entered into the Hanford Federal Facility Agreement and Consent Order (HFFACO). [Ex. A-79] The purposes of the HFFACO include ensuring compliance with RCRA and the Washington Hazardous Waste Management Act, chapter 70.105 RCW. [Ex. A-79, p. 7] The HFFACO requires Energy to bring the Hanford site into compliance with RCRA requirements specified in an attachment to the HFFACO called the "Action Plan." [Ex. A-79, p. 19] The Action Plan includes schedules for the work to be performed, which are known as "milestones." [Ex. A-79, p. 2-1; Appendix D] Milestone M-45-03A requires Energy to "initiate sluicing retrieval of C-106. Initiate sluicing retrieval of Tank 241-C-106 to resolve the high-heat safety issue and demonstrate waste retrieval." [Ex. A-79, p. D-27] The deadline for this work was October 31, 1997. [Ex. A-79, p. D-27]

II

Energy owns and operates the Hanford Site near Richland, Washington. Radioactive mixed waste is currently stored in 177 underground storage tanks at Hanford. [Tr. 22] The tanks range in capacity from 55,000 to one million gallons. [Tr. 22] They are buried approximately 12 feet beneath the ground surface. [Tr. 22] 149 of the tanks are of single-shell construction. [Tr. 22] Single-shell tanks have a steel liner and a concrete outer shell. [Tr. 22] The remaining 28 tanks are of double-shell construction. [Tr. 22] Double-shell tanks have a primary steel liner, a secondary steel liner, and a concrete outer shell. [Tr. 22] The space between the primary and secondary steel liner is known as the annulus. [Tr. 23, 24]

III

Tank C-106 is a single-shell tank with a capacity of 530,000 gallons. [Tr. 30; Ex. A-8, p. 2] It contains waste sludge rich in strontium, which generates high heat. [Tr. 28] Unless the waste is kept cool, the heat it generates could result in damage to the tank or a release of radioactive waste to the environment. [Tr. 28-29] Energy keeps the waste in Tank C-106 cool by adding water to the tank, and by providing forced air ventilation. [Tr. 29] Currently, Energy adds 6,000 gallons of water to Tank C-106 each month. [Tr. 29]

IV

Energy does not consider Tank C-106 to be a leaking tank. [Tr. 36] However, 67 of the 149 single-shell tanks at Hanford are known or assumed to have leaked. [Tr. 34; Ex. R-9, p. 4-39] Leaks from single-shell tanks travel directly to soils underneath the tanks. [Tr. 30] If Tank C-106 were to leak, Energy would have to continue adding water to the tank, which would contribute to the impact of the leak on the environment. [Tr. 36]

V

To resolve the high-heat waste problem in Tank C-106, the waste sludge will be removed from the tank and transferred to a double-shell tank, Tank AY-102. [Tr. 38] Liquid from Tank AY-102 will be routed through a pipe to Tank C-106, where it will be injected through a sluicing nozzle into the waste sludge. [Tr. 38] The resulting slurry will be pumped from Tank C-106 through a pipe back to Tank AY-102, and then allowed to settle in the new tank. [Tr. 38] This process is known as "sluicing retrieval." [Tr. 40]

VI

Before beginning sluicing retrieval of Tank C-106, Energy undertook a safety analysis that was designed to determine potential sources for accidents, evaluate the sources, and develop appropriate actions to prevent accidents that posed an unacceptably high risk. [Tr. 47] One of the potential accidents identified in the safety analysis was a phenomenon known as "steam bump." [Tr. 51] A steam bump can occur when waste sludge in a tank is heated beyond saturation temperature. [Tr. 51] When liquid makes contact with this high heat waste, steam is generated. [Tr. 182] A steam bump occurs when the steam is released from the waste into the tank. [Tr. 51] The release of steam could cause an overpressurization of the tank, potentially damaging the tank. [Tr. 51] The steam bump could damage the air filtration system, and could result in an airborne release of radioactive contamination into the environment. [Tr. 51] There is no dispute that the potential for steam bump is a genuine safety concern. [Tr. 111]

VII

There is little risk of steam bump if the temperature of the waste is maintained below the saturation limit. [Tr. 88] Ventilation is the primary method of controlling the temperature of the waste in Tank AY-102. [Tr. 88]. The annulus ventilation system of Tank AY-102 provides ventilation through the annulus of the tank. [Tr. 89]

VIII

In response to safety concerns raised about steam bumping in Tank AY-102, Energy, through its contractors, performed a thermal analysis evaluating whether waste could be maintained below the required temperature limits to avoid steam bumping. [Tr. 96] In evaluating the cooling capacity of the annulus ventilation system for Tank AY-102, Energy's contractors relied upon an assumption that air would reach the bottom of the tank at a flow rate

of 2000 CFM (cubic feet per minute). [Tr. 120] The air flow rate to the bottom of Tank AY-102 was critical to the success of this project and was necessary for safe operation. [Tr. 118] Energy's contractors made the 2000 CFM flow rate assumption based on discussions and an exchange of electronic mail messages with Gary Tardiff, the "cognizant engineer" for the AY Tank Farm. [Tr. 100, 120]. A cognizant engineer is a person, not necessarily an engineer, who is involved in the day-to-day operation and maintenance of the tanks. [TR. 99, 226] The contractors did not independently verify the accuracy of the 2000 CFM assumption.
[Tr. 103, 122]

IX

The thermal analysis performed by Energy's contractors was recorded in a January 1996 report entitled *Thermal Hydraulic Evaluation of Consolidating Tank C-106 Waste into Tank AY-102*. [Tr. 102, Ex. A-26] This report provided a technical basis for the ventilation and cooling portion of the project. [Tr. 118] Energy relied upon the thermal evaluation to conclude that a steam bump would not occur in Tank AY-102 during sluicing operations. [Tr. 53, 104]

X

In the summer of 1996, Bill Powell conducted a review of the thermal analysis. [Tr. 108, 109] Mr. Powell is a long time employee with at least 20 years experience at Hanford. [Tr. 211] Mr. Powell called into question the 2000 CFM assumption for air flow to the bottom of the tank. [Tr. 109] Mr. Powell did not believe that a flow rate of 2000 CFM to the bottom of the tank was possible given the current configuration of the tank. [Tr. 210]

XI

Mr. Powell was able to identify the mistaken assumption about the flow rate because of his prior experience with the ventilation system for Tank AY-102. Mr. Powell was appointed as the design authority for Tank AY-102 in the summer of 1996. [Tr. 108] A design authority is an experienced and senior-level engineer who is responsible for understanding a broad range of issues including system design, operation, and safety. [Tr. 98, 222] In 1989, Mr. Powell had conducted an extensive review of the flow rates for the annulus ventilation system in Tank AY-102. [Ex. R-20] His findings were published in a report entitled *Double Shell Tank Annulus Air Flows*. [Ex. R-20] The report states "[c]urrent operating conditions are 210 CFM to the bottom air slots, and 940 CFM to the side air inlets." [Ex. R-20, p. 30] The ventilation flow rate of 210 CFM described in the 1989 Powell report is significantly lower than the 2000 CFM assumed for the January 1996 thermal analysis.

XII

After Mr. Powell identified the error, Energy's contractors performed a second thermal analysis to determine the actual flow to the bottom of Tank AY-102. [Tr. 109, Ex. A-37] The second thermal analysis included an independent determination of the actual flow capabilities of the annulus ventilation system. [Tr. 110] The second thermal analysis concluded that the maximum ventilation flow rate to the bottom of Tank AY-102, in its configuration at the time of the analysis, would be approximately 155 CFM, a fraction of the 2000 CFM originally assumed. [Tr. 131, Ex. A-37 at p. 2-1] The flow rate of 155 CFM did not provide sufficient cooling to prevent a steam bump. [Tr. 131] After concluding that a steam bump could occur in Tank AY-102 during sluicing operations, Energy's contractors identified system modifications and operations changes that would prevent a steam bump. [Tr. 161] Those modifications and changes either have been, or will be, implemented. [Tr. 161] Energy estimates that sluicing of Tank C-106 will begin in September 1998. [Tr. 161]

XIII

It was not possible for 2000 CFM to reach the bottom of the tank as it was configured prior to 1997. This is because Tank AY-102 lacked block valves, and because there were physical limitations on the air flow pathway. Energy's contractors mistakenly assumed that the upper annulus inlets (which provide air flow to the side of the tank) could be shut off. [Tr. 122] When air enters the annulus ventilation system, the flow can either be directed to the wall of the annulus or to the bottom of the tank. [Tr. 112] If the upper annulus inlets were blocked, the entire annulus flow would be directed to the bottom of the tank, where it would be the most effective in cooling the waste. [Tr. 113] However, Tank AY-102 lacked the necessary equipment to block the air flow and, therefore, could not be blocked. [Tr.122] The upper annulus inlets were eventually blocked as part of the ventilation system modifications undertaken to provide sufficient ventilation to the bottom of the tank. [Tr. 112-113]

XIV

When the first thermal analysis was performed, information was available from a number of sources to show that the 2000 CFM floor flow rate assumption was erroneous. One source of such information was the 1989 Powell report. [Ex. A-26, p. 114] The authors of the first thermal analysis listed the 1989 Powell report as a reference. [Tr. 123, Ex. A-26, p. 114] The Powell report concluded that the actual flow rate to the bottom of Tank AY-102 was 210 CFM, a rate virtually identical to the 155 CFM rate derived during the second thermal analysis. [Ex. R-20] The Powell report should have alerted Energy's contractors to the overestimation of the flow rate to the bottom of the tank.

XV

Another source of accurate information about flow rates to the bottom of Tank AY-102 was Mr. Powell himself. Mr. Powell has worked at Hanford at all times relevant to this case. [Tr. 211] His knowledge of Tank AY-102 was clearly recognized, since he was appointed as the design authority for this tank in 1996. [Tr. 108]

XVI

Mr. Powell's 1989 report contained information other than the actual flow rate that should have alerted Energy that 2000 CFM was not available to the bottom of the tank. The first thermal analysis estimated that approximately 80% of the annulus ventilation air flow in Tank AY-102 is delivered to the upper annulus and only 20% is delivered to the bottom of Tank AY-102. [Ex. A-26, p. 10] The January 1996 thermal analysis cited the 1989 Powell report for this information. [Ex. A-26, pp. 110, 114]. The total amount of air flowing through the annulus ventilation system was 2000 CFM. [Ex. A-37, p. E-2; Tr. 205] Based on the distribution of the annulus air flow and the total amount of air moving through the annulus, this meant that no more than 20% of the total amount of air flow, or 400 CFM, could be delivered to the bottom of the tank.

XVII

Finally, if Energy's contractors had performed actual testing to determine the flow rate to the bottom of Tank AY-102, they would have learned that the air flow configuration in the tank prevented 2000 CFM from reaching the bottom of the tank. These were the conclusions reached when Mr. Powell performed such testing in 1989, and again when the second thermal analysis was performed.

XVIII

If accurate information about the annulus ventilation system flow rate to the bottom of Tank AY-102 had been used during the first thermal analysis, the potential for a steam bump in the tank would have been recognized many months earlier.

XIX

On May 6, 1997, Energy requested that Ecology extend Milestone M-45-03A from October 1997 to September 1998. [Ex. A-48] A milestone under the HFFACO may be extended "when good cause exists for the requested extension." [Ex. A-79, p. 67] Under the HFFACO, good cause exists for an extension when sought in regard to:

A. An event of force majeure as defined in Article XLVII (Force Majeure), subject to Ecology's reservation in Paragraph 147;

B. A delay caused by another Party's failure to meet any requirement of this Agreement;

C. A delay caused by the invocation of Dispute Resolution to the extent provided by paragraph 30(F) and paragraph 59(I) or judicial order;

D. A delay caused, or which is likely to be caused, by the grant of an extension in regard to another timetable and deadline or schedule; and

E. Any other event or series of events mutually agreed to by the Parties as constituting good cause.

[Ex. A-79, p. 67] On May 20, 1997, Ecology denied Energy's request. [Ex. A-49] Energy then invoked the dispute resolution provisions of the HFFACO. [Ex. A-50] At the conclusion of the dispute resolution process, Ecology Director Tom Fitzsimmons issued a final decision denying the requested extension. [Ex. R-7] Energy did not initiate sluicing by October 31, 1997, and, therefore, failed to meet Milestone M-45-03A. [Tr. 161, 262] Ecology has not assessed penalties for failure to meet this milestone. [Tr. 263]

XX

Energy filed this timely appeal of Ecology's final decision with the Board on November 6, 1997. The sole issue on appeal is whether good cause exists for an extension of Milestone M-45-03A.

XXI

Any Conclusion of Law that should be deemed a Finding of Fact is hereby adopted as such.

From these Findings of Fact come these

CONCLUSIONS OF LAW

I

The Board has jurisdiction over this matter and the parties under RCW 43.21B and RCW 70.105.

II

Since this case does not involve the issuance of a penalty or a regulatory order, appellant Energy bears the burden of proof. *See* WAC 371-08-485(2).

III

The dispute in this case arises under the Hanford Federal Facility Agreement and Consent Order. The portions of the HFFACO that address Energy's hazardous waste compliance obligations at Hanford, including Milestone M-45-03A, are enforceable as a regulatory compliance order under RCW 70.105.095.

IV

The HFFACO allows milestones to be extended when good cause exists. *See* HFFACO at 67, ¶ 119. The parties did not expressly define in the HFFACO what constitutes good cause. They did, however, specify four events that would constitute good cause, and then included a fifth category, which is "any other event or series of events mutually agreed to by the Parties as constituting good cause." *Id.* at ¶ 120. Based on the four specific events the parties agreed constitute good cause, we conclude that good cause exists when Energy is unable to comply with a deadline in the HFFACO due to circumstances beyond its control, or due to delays directly resulting from other extensions or processes agreed to by the parties. The first part of this standard is also consistent with Washington cases examining what constitutes good cause for purposes of seeking delay in court proceedings. *See State v. Tomal*, 133 Wn.2d 985, ___ P.2d ___ (1997); *State v. Dearbone*, 125 Wn.2d 173, 883 P.2d 303 (1994).

V

Circumstances beyond Energy's control did not prevent Energy or its contractors from discovering during the first thermal analysis that conditions in Tank AY-102 were conducive to a steam bump. Accurate information about the annulus ventilation system flow rate to the bottom of Tank AY-102 was available when Energy's contractors performed the first thermal analysis in January 1996. The fact that Energy's contractors were given inaccurate information about this flow rate, and that they thought their reliance on the inaccurate information was reasonable, is irrelevant. As the owner and operator of the Hanford tanks, Energy is responsible for ensuring their compliance with state hazardous waste law, including regulatory orders implementing that law. Energy bears the risk that information it relies on in attempting to comply with the law is faulty. *See Hansen, Hansen & Johnson v. PSAPCA*, PCHB Nos. 85-226 and 85-227 (Final Findings of Fact, Conclusions of Law and Order) at 7 (1986).

VI

Energy's failure to use the correct flow rate information in the first thermal analysis cannot be excused because the work was performed by Energy's contractors. Energy is responsible for complying with the state hazardous waste law, whether it performs the work itself or through contractors. *See ADP Fluor Daniel v. Ecology*, PCHB No. 97-96 (Order on Motion to Void or to Stay Remediation Order) at 2, n.1 (1997). The HFFACO imposes the same requirement on Energy. *See* HFFACO at 7, ¶ 13.

VII

We conclude that good cause for extending Milestone M-45-03A does not exist.

VIII

Any Finding of Fact that is deemed to be a Conclusion of Law is hereby adopted as such. From these Conclusions of Law, the Board enters the following:

ORDER

Ecology's final determination denying the requested extension of Milestone M-45-03A is affirmed.

DATED this 29th day of September, 1998.

POLLUTION CONTROL HEARINGS BOARD

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