The dataset presented in this article are related to the research article entitled “Hybrid coagulation-UF processes for spent filter backwash water treatment: a comparison studies for PAFCl and FeCl₃ as a pre-treatment” (Ebrahimi et al., 2017) [1]. This article reports the cost estimation for treating produced spent filter backwash water (SFBW) during water treatment in Isfahan- Iran by various methods including primary sedimentation, coagulation & flocculation, second clarification, ultra filtration (UF) and recirculation of settled SFBW to water treatment plant (WTP) entrance. Coagulation conducted by PAFCl and FeCl₃ as pre polymerized and traditional coagulants. Cost estimation showed that contrary to expectations, the recirculation of settled SFBW to WTP entrance is more expensive than other method and it costs about $37,814,817.6. Versus the cheapest option related to separate primary sedimentation, coagulation & flocculation in WTP. This
option cost about $4,757,200 and $950,213 when FeCl3 and PAFC1 used as coagulant, respectively.© 2017 The Authors. Published by Elsevier Inc. This is an open access article under the CC BY license (http://creativecommons.org/licenses/by/4.0/).

Specifications Table

| Subject area | Environmental engineering |
|--------------|---------------------------|
| More specific subject area | Water reuse |
| Type of data | Table |
| How data was acquired | - Experimental results attained from pilot plant that include primary sedimentation, coagulation & flocculation, ultra filter and recirculation of settled SFBW to WTP entrance. - Cost estimation for full scale treatment for SFBW. - Cost estimation for different method that proposed for SFBW treatment including: mixing of settled SFBW with raw water entered to WTP, Separate primary sedimentation, coagulation & flocculation in WTP, Separate primary sedimentation, coagulation & flocculation and secondary sedimentation in WTP and Separate primary sedimentation, coagulation & flocculation, secondary sedimentation and UF process in WTP |
| Data format | Raw and analysed |
| Experimental factors | Application of sedimentation, coagulation & flocculation, UF process and return of SFBW to WTP for SFBW treatment Cost estimation for each process according to dimension, chemical consumption and necessary equipment. |
| Data source location | Isfahan’s WTP in Iran |
| Data accessibility | Some data are within this article and some presented in published article. Of course published data was presented in this article but with reference number and citation. |

Value of the data

- The data presents the suitable method among recirculation of settled SFBW to WTP entrance, coagulation & flocculation, and ultra filtration process for SPBW treatment
- Cost estimation for SFBW reuse by mentioned methods at full scale.
- Effect of cost estimation on process selection and Vice versa.

1. Data

The dataset of this article provides information on the cost estimation of SFBW treatment by various methods, including recirculation of settled SFBW to WTP entrance, coagulation & flocculation, and ultra filtration process. Coagulation conducted with two different coagulant including PAFC1 and FeCl3. Tables 1, 2 and 3 show the amount of coagulants consumption (according to optimum dose of coagulants) and cost estimation for all process that used for SFBW treatment at full scale.
2. Experimental design, materials and methods

2.1. Quantity of raw SFBW

Coagulation, flocculation, sedimentation and rapid sand filtration processes are main section of Isfahan water treatment plant that treats 12 m³/s of water. There are 48 filter units in this plant and PACl used as coagulant. During backwashing of each filter, some 500 m³ of wastewater was generated. Considering 48 filter with 24 h cleaning interval it accounts for about 2.25% of the raw water entering to the plant. So, during water treatment process approximately 24,000 m³/d of SFBW is generated.

2.2. Experimental procedure

In our previous study, continues processes including primary sedimentation, coagulation, flocculation, secondary sedimentation and UF were used for the SFBW treatment. Inflow of all sections of the pilot except UF membrane was 10 l/h. Hydraulic retention time (HRT) for mentioning sections, except UF membrane was 60, 6, 48 and 192 min. Optimum pH for coagulation with PAFCl and FeCl₃ was 8.3. Also, optimum doses of PAFCl and FeCl₃ were 10 mg/L and 30 mg/L for spring and summer and 15 mg/L and 40 mg/L for autumn and winter seasons. Mixing speed at rapid mixer basin was 80 rpm. Mixing speed at flocculation tanks was 48 rpm. The UF module was operated in a dead-end mode with constant filtration about 8 L m⁻² h⁻¹ at a trans-membrane pressure of 300 Pa. It was operated in a cycle of 60 min filtration and 1 min backwashing with permeate in the reverse direction. At the end the recirculation of settled SFBW to WTP entrance and mixing with raw water was investigated according to its effects on coagulation usage at WTP in full scale situation [1–4]. All dimensions for full scale treatment were designed and by considering civil construction materials, chemical consumption, equipments and other important parameters cost estimation was done.

The importance of proper treatment processes for SFBW is that in case there are some concentrations of pollutants being accumulated in the SFBW they will be removed to much lower concentrations with lower costs than advanced water treatment processes [5–7].

Table 1
The amount and cost of coagulant that is need for treating SFBW at full scale.

| Parameters                          | Full scale       |
|------------------------------------|------------------|
|                                    | FeCl₃            | PAFCl           |
| Optimum dose (mg/L)                | 40 and 30        | 15 and 10       |
| Annual consumption (kg)            | 302,400          | 108,000         |
| Consumption during design period (kg) | 7,560,000        | 2,700,000       |
| The annual cost (USD)              | 181,440          | 29,160          |
| Total cost during design period (USD) | 4,536,000        | 729,000         |

a In this study the optimum doses of FeCl₃ and PAFCl for autumn and winter was 40 and 15 mg/L, respectively and for spring and summer were 30 and 10 mg/L, respectively. So in this section cost data related to summation of two different amounts of doses during seasons.

b The average value cost of buying in global market for FeCl₃ in 2016 was about 600 USD per ton and for PAFCl was 270 USD per ton.

c Design period for full scale was 25 years that operated daily with 24,000 m³/d entrance, but for pilot scale design period was 4 years and operated 12 h in day with 10 l/h inflow.

(Q = 24,000 m³/d). Also all dimension, instrument, chemical matter and required parameters for water treatment plant were estimated and used for estimation.
Table 2
Cost estimation for treating SFBW with primary sedimentation, coagulation & flocculation, secondary sedimentation and UF process in a full scale (design period was 25 years and Q = 24,000 m³/d) [4].

| Units and processes | Section | Dimension or equipment | Cost per USD (US$) |
|---------------------|---------|------------------------|--------------------|
| **Primary sedimentation** | Civil construction | Reinforced concrete, 2 rectangular basin, L = 45 m, W = 9 m, H = 3.8 m, t = 2.5 h | 70,714.3 |
| | Electromechanical instrument | 2 mobile bridge for sludge collection, 3 pumps and supplementary instrument | 29,714.2 |
| | Repair and reconstruction | All mechanical instrument during design period | 27,428 |
| | Energy consumption | All mechanical instrument used in primary sedimentation | 11,142.8 |
| **Coagulation and flocculation** | Civil construction | Reinforced concrete, for square coagulation basin L = 1.9 m, W = 1.9 m, H = 2.75 m, t = 30 s, for flocculation basin L = 13 m, W = 9 m, H = 5.3 m, t = 30 min. | 24,857.1 |
| | Electromechanical instrument | Coagulation: 2 mixer with 15 kw/h, gear box, shaft and supplementary instrument. Flocculation: 3 mixers with 1 kw/h, gear box, bridge, shaft and supplementary instrument. | 3485.7 |
| | Repair and reconstruction | All mechanical instrument during design period | 24,000 |
| | Energy consumption | All mechanical instrument used in coagulation and flocculation | 29,781.4 |
| | | | 86,571.42 |
| | | | 29,714.2 |
| **Secondary sedimentation** | Civil construction | Reinforced concrete, 2 rectangular basin, L = 50 m, W = 10 m, H = 4.5 m, t = 4 h | 86,571.42 |
| | Electromechanical instrument | 4 mobile bridge for sludge collection, 3 pumps and supplementary instrument | 29,714.2 |
| | Repair and reconstruction | All mechanical instrument during design period | 27,428 |
| | Energy consumption | All mechanical instrument used in secondary sedimentation | 11,142.8 |
| **FeCl₃ requirement during 25 year operation** | During coagulation | Optimum dose of FeCl₃ in this study for autumn and winter was 40 mg/L and for spring and summer was 30 mg/L | 4,536,000 |
| **PAFCl requirement during 25 year operation** | During coagulation | Optimum dose of PAFCl in this study for autumn and winter was 15 mg/L and for spring and summer was 10 mg/L | 729,000 |
| **UF** | UF process | 500 module of PES UF, size of each modules was 8 in. x 40 in. | 571,428 |
| | | | 266,857 |
| | Electromechanical instrument and Energy consumption | 2 feed pump, 2 backwash pump | |
| | Repair and reconstruction | All UF module and mechanical instrument during design period | 2,293,428 |
| | Chemical cleaning | Annual UF cleaning by NaOH and Citric acid during design period | 950 |
| | | | 428,571 |
| | **staffs and employee** | Laborer, electromechanical expert, water operator and guard | | |
| | Repair and reconstruction | | | |
| | Chemical cleaning | | | |
| | Total cost for treatment by FeCl₃ and UF with 30% increment as a safety factor | - | 11,015,178 |
| | Total cost for treatment by PAFCl and UF with 30% increment as a safety factor | - | 6,066,078 |

a Consumable instrument was replaced in 5 years interval over 25 years with an annual profit increase of 15%.

b Energy consumption for water and wastewater treatment plant in Isfahan is under agriculture industry. Power consumption Prices during 19 p.m. to 23 p.m. was 0.01257 USD, during 23 p.m. to 7 a.m. was 0.002 USD and during 7 a.m. to 19 p.m. was 0.00628 USD.
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Transparency document. Supporting information

Transparency data associated with this article can be found in the online version at http://dx.doi.org/10.1016/j.dib.2017.10.040.

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Table 3
Cost for SFBW treatment with different methods and process.

| Method of treatment | Coagulant | Cost per USD (US$) |
|---------------------|-----------|--------------------|
| Mixing of settled SFBW with raw water entered to WTP | PACl | 37,814,817.6 |
| Separate primary sedimentation, coagulation & flocculation in WTP | FeCl3 | 4,757,200 |
| | | PAFCl | 950,213 |
| Separate primary sedimentation, coagulation & flocculation and secondary sedimentation in WTP | FeCl3 | 4,912,000 |
| | | PAFCl | 1,105,000 |
| Separate primary sedimentation, coagulation & flocculation, secondary sedimentation and UF process in WTP | FeCl3 | 11,015,000 |
| | | PAFCl | 6,066,000 |